

An apparatus for the treatment of a medical liquid

Claims

1. An apparatus for the treatment of a medical liquid comprising a liquid treatment machine and a cassette insertable into it substantially consisting of a rigid base body of a cassette with fitted chambers and passages and a foil covering them, characterized in that actuators and sensors are arranged in the liquid treatment machine for the operation of the apparatus with the inserted cassette such that cassettes can be inserted in different integration shapes.
2. An apparatus in accordance with claim 1, wherein the cassettes are made as disposables (disposable cassettes).
3. An apparatus in accordance with either of claims 1 or 2, wherein the cassettes can be used for different application purposes.

4. An apparatus in accordance with claim 3, wherein the application purposes are the standard hemodialysis, online hemodiafiltration or online hemofiltration or acute treatment.
5. An apparatus in accordance with any one of the preceding claims, wherein the cassette has a molded handle at the side at the rigid base body of the cassette.
6. An apparatus in accordance with claim 5, wherein a dialyzer is integrated at the side at the base body of the cassette, with it simultaneously forming the handle.
7. An apparatus in accordance with any one of claims 1 to 6, wherein the liquid treatment machine has a frame to which a door is fitted and in which a machine block is guided, with the door and the machine block being alignable with respect to one another such that the cassette can be received between them in a sealed manner.
8. An apparatus in accordance with claim 7, wherein the machine block is guided movably in the frame, with it being movable in the direction of the closed door for the sealing reception of the cassette via a pressing actuator system consisting of an air cushion.
9. An apparatus in accordance with either of claims 7 or 8, wherein an air distributor plate with integrated passages adjoins the machine block and compressed air and/or vacuum can be guided via it from corresponding pneumatic connections to actuators and valves in the machine block.
10. An apparatus in accordance with any one of claims 1 to 9, wherein at least one centering recess is cut out in the cassette which engages into at least one projection at the frame side; and in that optionally, additionally, at least

one stop means, for example a snap-in hook, is provided via which the cassette can be fixed on the surface of the machine block.

11. An apparatus in accordance with any one of claims 1 to 10, wherein the door can be latched to the frame after its closing, with the latched state being monitorable via sensors.
12. An apparatus in accordance with any one of claims 1 to 11, wherein an elastic mat is arranged between the cassette and the machine block.
13. An apparatus in accordance with claim 12, wherein the elastic mat has recesses for pump chamber to be provided, for example, and mat passages which extend along liquid-carrying passages of the cassette.
14. An apparatus in accordance with any one of claims 1 to 13, wherein sensor modules are integrated in the liquid treatment machine substantially for the determination of the parameters of the medical liquid to be treated and which are each designed in pairs and of which one part of the pair is installed in the machine block and the other part in the door.
15. An apparatus in accordance with any one of claims 1 to 14, wherein a venting unit is integrated in the liquid treatment machine which can be coupled to a gas-permeable membrane integrated in the cassette.
16. An apparatus in accordance with any one of the preceding claims, wherein the surface of the machine block and of the cassette is in each case divided into a plurality of surface regions (A, B), with the components of actuators or sensors to be coupled being accommodated in one surface which are common as a basic variant to all cassettes and wherein further surfaces are contained in which actuators or sensors to be used optionally are arranged.

17. A cassette for use in an apparatus in accordance with any one of claims 1 to 16, characterized in that it has at least one, preferably two, pump chambers, at least one measuring chamber, a venting chamber, integrated passages and a plurality of ports.
18. A cassette in accordance with claim 17, wherein the base body of the cassette consists of polypropylene.
19. A cassette in accordance with any one of the preceding claims, wherein the cover foil consists of a polyolefin elastomer mixture.
20. A cassette in accordance with any one of the preceding claims, wherein the venting chamber is formed, on the one hand, by a molding in the base body of the cassette and, on the other hand, by the cover foil which can be sucked into a recess provided for this purpose at the machine side.
21. A cassette in accordance with any one of the claims 17 to 20, wherein the at least one pump chamber has substantially tangential inlets and outlets.
22. A cassette in accordance with claim 21, wherein the at least one pump chamber substantially has the shape of a spherical section and wherein a standing bead is formed such that a flushing passage is formed between the upper edge of the base body of the cassette and the cover foil in the pressing-out phase.
23. A cassette in accordance with claim 22, wherein the spherical surface of the pump at the machine side has a smaller radius in comparison with the pump chamber at the cassette side such that a flushing passage is formed which corresponds to the width of the radius difference between the spherical surface of the pump and the pump chamber.

24. A cassette in accordance with any one of the claims 17 to 23, wherein the at least one measuring chamber has the shape of a diffuser nozzle.
25. A cassette in accordance with any one of the claims 17 to 24, wherein all passages and chambers each have an edge bead at the side which faces the cover foil and wherein optionally webs accompanying the passage are formed at the rear side of the passage and a linear pressing force distribution can be achieved via them.
26. A cassette in accordance with any one of the claims 17 to 25, wherein the base body of the cassette is welded to the cover foil at the outer edge and wherein an optionally substitute-carrying region in the cassette is surrounded by a weld seam.
27. A cassette in accordance with any one of the preceding claims, wherein it is operable in two-needle or single-needle operation.
28. A cassette set consisting of cassettes in accordance with at least one of the preceding claims, characterized in that the set comprises cassettes for the application purposes standard hemodialysis, online hemodiafiltration or online hemofiltration and acute treatment.